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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,297	11/02/2006	Naoyuki Kobayashi	128977	8374

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EXAMINER	
ASFAW, MESFIN T	

ART UNIT	PAPER NUMBER
2882	

NOTIFICATION DATE	DELIVERY MODE
07/22/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

OfficeAction25944@oliff.com
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Office Action Summary	Application No.	Applicant(s)	
	10/588,297	KOBAYASHI ET AL.	
	Examiner	Art Unit	
	MESFIN T. ASFAW	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 April 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10,30-33,35,44,65,68,70-72 and 74-93* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10,30-33,35,44,65,68,70-72 and 74-93* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *See Continuation Sheet*
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :10/25/2010, 03/28/2011, 04/26/2011.

DETAILED ACTION

The amendment filed on 04/26/2011 has been entered. Claims 1-8, 10, 30-33, 35, 44, 65, 68, 70-72 and 74-93 are pending in this application.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-8, 10, 30-33, 35, 44, 65, 68, 70-72 and 74-83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori et al. [US 5063582 A, hereafter Mori] in view of Tabarelli et al. [US 4509852 A, hereafter Tabarelli] and Lof et al. [US 20040136494 A1, hereafter Lof].

As per Claims 1, and 44, Mori teaches an exposure apparatus **(See fig. 1)** which exposes a substrate **4** by radiating an exposure light beam onto the substrate, the exposure apparatus comprising:

A substrate stage **6** having a substrate-holding member **5** by which the substrate **4** is held; and a temperature adjustment system **9** which performs temperature adjustment for the substrate-holding member **(Column 2 line 20 - Column 3 line 15)**.

Mori does not explicitly teach a supply inlet from which the liquid is supplied, the liquid supplied from the supply inlet covering only a portion of an upper surface of the substrate during exposure. Exposing the substrate through a liquid and adjusting the

temperature of the substrate-holding member that holds the substrate on an underside of it, depending on a temperature of the liquid to be supplied from the supply inlet onto the substrate held by the substrate-holding member.

Tabarelli teaches the use of an immersion liquid to expose the a semiconductor disk **(substrate)** through, wherein the liquid **6** cleans the semiconductor disk **8** retained on the support **1** by means of vacuum lines **9** and keeps the temperature of the disk constant, feeding pipes **4 (inlet pipe)** and discharge pipes **5 (outlet)** leading to the container **2** create constant conditions. A pump **10**, a filter **11** and means **12** effecting a temperature increase or decrease depending on the measured temperature **(See fig. 3-4, Column 6 lines 28-42)**.

Therefore, it would have been obvious, to one of ordinary skill in the art at time the invention was made, to incorporate the immersion system of Tabarelli in the exposure system of Mori so that irradiating an exposure light beam onto the substrate through a liquid is possible with increased refractive index.

Moreover, one of ordinary skill in the art would be motivated to keep the temperature of the substrate-holding member and that of immersion liquid at the same predetermined level, because the ultimate goal is to keep the temperature of the substrate at a controlled acceptable range as disclosed by Mori and Tabarelli such that to avoid substrate deformation that results in diminished quality of image transfer.

Mori as modified by Tabarelli does not explicitly teach the liquid supplied from the supply inlet covering only a portion of an upper surface of the substrate during exposure.

Lof teaches a supply inlet from which the liquid is supplied, the liquid supplied from the supply inlet covering only a portion of an upper surface of the substrate during exposure **(See fig. 4-5, Para 15)**.

Therefore, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to incorporate the immersion system of Lof in the exposure apparatus of Mori as modified by Tabarelli in order to avoid submersing the substrate or substrate and substrate table in a bath of liquid which may mean that there is a large body of liquid that must be accelerated during a scanning exposure, and form a concise, efficient and cost effective immersion system.

As per Claims 2-4, Mori as modified by Tabarelli and Lof teaches the temperature adjustment system performs the temperature adjustment for the substrate-holding member so that heat transfer is reduced between the substrate and the liquid on the substrate **(the temperature of the substrate-holding member and the temperature of immersion liquid should be set at the same temperature such that to keep temperature of the substrate at a predetermined temperature, therefore the heat transfer between the substrate and the liquid on the substrate would be reduced or no net heat transfer among the liquid, the substrate and the holding member occurs)**.

As per Claim 5, Mori in view of Tabarelli and Lof teaches a surface position-detecting unit which detects surface position information about a surface of the substrate by emitting a detecting light beam onto the substrate through the liquid and receiving a reflected light beam from the substrate through the liquid **(Lof Para 24)**,

wherein the temperature adjustment system performs the temperature adjustment for the substrate-holding member to suppress measurement error of the surface position-detecting unit due to the temperature change of the liquid **(Tabarelli Column 6 lines 28-42)**.

As per Claim 6, Mori in view of Tabarelli and Lof teaches the temperature adjustment system 9 performs the temperature adjustment for the substrate-holding member 5 so that no temperature change of the substrate is caused by contact between the liquid and the substrate **(the temperature of the substrate-holding member and the temperature of immersion liquid should be set at the same temperature such that to keep temperature of the substrate at a predetermined temperature, therefore the heat transfer would be reduced between the substrate and the liquid on the substrate or no net heat transfer among the liquid, the substrate and the holding member)**.

As per Claim 7, Mori in view of Tabarelli and Lof teaches a mark-detecting system which detects an alignment mark on the substrate not through the liquid **(Lof Para 26)**, wherein the temperature adjustment system performs the temperature adjustment for the substrate-holding member so that no temperature change of the substrate is caused by the contact between the liquid and the substrate **(Lof Para 26 and Tabarelli Column 6 lines 28-42)**.

As per Claim 8, Mori as modified by Tabarelli and Lof does not explicitly teach the temperature adjustment system uses a liquid which is the same as the liquid to be

supplied onto the substrate to perform the temperature adjustment for the substrate-holding member.

However, the combined teaching of Mori and Tabarelli teaches that a liquid with the same temperature is supposed to be delivered both to the substrate stage, and in the space between the optical element and the substrate such that heat transfer between the stage and the wafer and between the wafer and the liquid disposed above the wafer is minimized.

Therefore, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to employ a liquid supply system that can deliver a liquid to the substrate-holding member and onto the substrate to reduce the chance of a temperature variation between the two liquids and reduce the cost by using the same supply unit.

As per Claim 10, Mori teaches a temperature sensor **15** which measures a temperature of the substrate-holding member **(See fig. 4, Column 3 line 57 - Column 4 line 2)**.

As per Claims 70-72, Mori as modified by Tabarelli and Lof teaches the exposure apparatus according to claim10, wherein the temperature adjustment system performs the temperature adjustment for the substrate-holding member so that the measured temperature of the substrate-holding member is the same as the temperature of the liquid to be supplied onto the substrate held by the substrate-holding member **(as addressed in claim 1, wherein the temperature of the substrate-holding member**

and the temperature of the immersion liquid is kept at the same predetermined level such that to keep the temperature of the substrate constant and stable).

As per Claims 74-83, Mori in view of Tabarelli and Lof teaches the method as claimed, because under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claims, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. See In re King, 801 F.2d 1324,231 MPEP 2112.02".

As per Claims 30, 65, 68, Mori teaches an exposure apparatus **(See fig. 1)** which exposes a substrate **4** by radiating an exposure light beam onto the substrate, the exposure apparatus comprising:

a substrate stage **6** having a substrate-holding member **5** by which the substrate is held **(Column 2 line 20 - Column 3 line 15)**; an exposure station **(See fig. 1)** which performs exposure for the substrate **4** held by the substrate stage **5**.

Mori does not explicitly teach exposing the substrate through a liquid and adjusting the temperature of the substrate-holding member depending on a temperature of the liquid to be supplied onto the substrate held by the substrate-holding member.

Tabarelli teaches the use of an immersion liquid to expose the a semiconductor disk **(substrate)** through, wherein the liquid **6** cleans the semiconductor disk **8** retained on the support **1** by means of vacuum lines **9** and keeps the temperature of the disk constant, feeding pipes **4** and discharge pipes **5** leading to the container **2** create

constant conditions. A pump **10**, a filter **11** and means **12** effecting a temperature increase or decrease depending on the measured temperature **(Column 6 lines 28-42, wherein Tabarelli recognizes the problem of keeping the temperature in the exposure region as constant as possible)**.

Therefore, it would have been obvious, to one of ordinary skill in the art at time the invention was made, to incorporate the immersion system of Tabarelli in the exposure system of Mori so that irradiating an exposure light beam onto the substrate through a liquid is possible with increased refractive index.

Moreover, one of ordinary skill in the art would be motivated to keep the temperature of the substrate-holding member and the temperature of the liquid at the same predetermined level because the ultimate goal is to keep the temperature of the substrate at a predetermined level as disclosed by Mori and Tabarelli such that to avoid the adverse effect of wafer deformation on the image transfer due to the heat from the exposure radiation.

Mori in view of Tabarelli does not explicitly teach a second substrate stage having a second substrate-holding member by which the second substrate is held, and the second substrate-holding member being movable below the supply inlet; wherein the supplied liquid covering only a portion of an upper surface of the substrate held by the other of the stages during the exposure; a measuring station which performs measurement for one of the substrates held by one of the stages; and

temperature adjustment systems which are provided for the first substrate stage and the second substrate stage respectively and which perform temperature adjustment

for the substrate-holding member of each of the stages depending on a temperature of the liquid to be supplied from the liquid supply system.

Lof teaches a first substrate stage **(measurement stage)** which has a substrate-holding member for holding the substrate and which is movable while holding the substrate by the aid of the substrate-holding member **(See fig. 2)**; a second substrate stage **(exposure station)** which has a substrate-holding member for holding the substrate and which is movable, wherein the exposure station being provided with the liquid supply system which supplies the liquid onto the substrate held by the other of the stages **(See fig. 3)**, the supplied liquid covering only a portion of an upper surface of the substrate held by the other of the stages during the exposure **(See fig. 4)**; a measuring station 30 which performs measurement for the substrate held by one of the stages **(See fig. 3, Para 10 and 23)**.

Therefore, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to incorporate the dual stage system of Lof in the lithographic system of Mori as modified by Tabarelli in order to increase substantially the machine throughput.

Furthermore, one of ordinary skill in the art would have used the same temperature controlling system for both substrate tables in order to make the system consistent and efficient which processes the substrate under identical temperature conditions and also provides a system which conserves a space.

As per Claim 31, Lof teaches wherein the measurement for the substrate in the measuring station includes measurement of surface position information about a surface of the substrate **(Para 24)**.

As per Claim 32, Lof teaches wherein the measurement for the substrate in the measuring station includes detection of an alignment mark on the substrate **(Para 26)**.

As per Claim 33, Mori teaches wherein the temperature adjustment system performs the temperature adjustment for the substrate-holding member before performing the measurement for the substrate **(Abstract)**.

As per Claim 35, Mori teaches the temperature adjustment system performs, after the measurement for the substrate in the measuring station, the temperature adjustment for the substrate-holding member to suppress temperature change of the substrate **(Column 3 lines 15-57)**.

3. Claims 84-93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lof in view of Mori and Tabarelli.

As per Claim 84, Lof teaches an exposure apparatus **(See fig. 1)** which exposes a substrate by radiating an exposure light beam onto the substrate W through a liquid **(See fig. 3)**, the exposure apparatus comprising:

a supply inlet IN from which the liquid is supplied **(See fig. 5)**, the liquid supplied from the supply inlet covering only a portion of an upper surface of the substrate during exposure **(See fig. 4, Para 15)**;

a substrate stage having a substrate-holding member **WT** by which the substrate **W** is held, the substrate holding-member holding the substrate and the substrate-holding member being movable below the supply inlet (**See fig. 4, wherein the movement of the wafer table is shown by the arrow**).

Lof does not explicitly teach the substrate holing-member holding the substrate on an underside of the substrate and a temperature adjustment system which performs temperature adjustment for the substrate-holding member so that a temperature of the substrate-holding member is the same as a temperature of the liquid to be supplied onto the substrate held by the substrate-holding member.

Mori teaches a temperature control system to keep the temperature of the wafer to a predetermined temperature by which the temperature rise of the wafer during the exposure can be limited within the tolerable range.

Therefore, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to incorporate the temperature controlling system of More in the lithographic system of Lof in order to prevent thermal deformation.

Lof in view of Mori does not explicitly teach the substrate holing-member holding the substrate on an underside of the substrate and a temperature adjustment system which makes a temperature of the substrate-holding member the same as a temperature of the liquid to be supplied onto the substrate held by the substrate-holding member.

Tabarelli teaches the use of an immersion liquid to expose the a semiconductor disk **(substrate)** through, wherein the liquid **6** cleans the semiconductor disk **8** retained

on the support **1** by means of vacuum lines **9** and keeps the temperature of the disk constant, feeding pipes **4** and discharge pipes **5** leading to the container **2** create constant conditions. A pump **10**, a filter **11** and means **12** effecting a temperature increase or decrease depending on the measured temperature **(Column 6 lines 28-42)**.

Therefore, it would have been obvious, to one of ordinary skill in the art at time the invention was made, to incorporate the immersion liquid temperature control system of Tabarelli in the exposure system of Lof as modified by Mori so that irradiating an exposure light beam onto the substrate through a liquid is possible with increased refractive index and stabilized temperature condition.

Moreover, one of ordinary skill in the art would be motivated to keep the temperature of the substrate-holding member and the temperature of the liquid at the same predetermined level because the ultimate goal is to keep the temperature of the substrate at a predetermined level as disclosed by Mori and Tabarelli such that to avoid the adverse effect of wafer deformation on the image transfer due to the heat from the exposure radiation.

As per Claim 85-87 and 93, Lof in view of Mori and Tabarelli teaches the exposure apparatus according to claim 84, wherein the temperature adjustment system performs the temperature adjustment for the substrate-holding member so that heat transfer is reduced between the substrate and the liquid on the substrate **(as addressed in claim 84, if the temperature of the substrate-holding member and the liquid is kept at the same predetermined level, the substrate temperature will**

also be the same as the above two elements and heat transfer among them would be minimized).

As per Claim 88, Lof in view of Mori and Tabarelli teaches the exposure apparatus according to claim 86, further comprising a surface position-detecting unit which detects surface position information about a surface of the substrate by emitting a detecting light beam onto the substrate through the liquid and receiving a reflected light beam from the substrate through the liquid, wherein the temperature adjustment system performs the temperature adjustment for the substrate-holding member to suppress measurement error of the surface position-detecting unit due to the temperature change of the liquid **(Lof Para 24, Tabarelli Column 6 lines 28-42)**.

As per Claim 89, Lof in view of Mori and Tabarelli teaches the exposure apparatus according to claim 84, wherein the temperature adjustment system performs the temperature adjustment for the substrate-holding member so that no temperature change of the substrate is caused by contact between the liquid and the substrate **(as addressed in claim 84, if the temperature of the substrate-holding member and the liquid is kept at the same predetermined level, the substrate temperature will also be the same as the above two elements and heat transfer among them would be minimized)**.

As per Claim 90, Lof in view of Mori and Tabarelli teaches the exposure apparatus according to claim 89, further comprising a mark-detecting system which detects an alignment mark on the substrate not through the liquid, wherein the temperature adjustment system performs the temperature adjustment for the substrate-

holding member so that no temperature change of the substrate is caused by the contact between the liquid and the substrate after detecting the mark by the mark-detecting system **(Lof Para 26 and Tabarelli Column 6 lines 28-42)**.

As per Claim 91, Lof as modified by Mori and Tabarelli does not explicitly teach the temperature adjustment system uses a liquid which is the same as the liquid to be supplied onto the substrate to perform the temperature adjustment for the substrate-holding member.

However, the combined teaching of Mori and Tabarelli teaches that a liquid with the same temperature is supposed to be delivered both to the substrate stage, and in the space between the optical element and the substrate such that heat transfer between the stage and the wafer and between the wafer and the liquid disposed above the wafer is minimized.

Therefore, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to employ a liquid supply system that can deliver a liquid to the substrate-holding member and onto the substrate to reduce the chance of a temperature variation between the two liquids and reduce the cost by using the same temperature maintenance and supply unit.

As per Claim 92, Lof in view of Mori and Tabarelli teaches the exposure apparatus according to claim 84, further comprising a temperature sensor **15** which measures a temperature of the substrate-holding member **(See Mori fig. 4)**.

Response to Arguments

4. Applicant's arguments filed 04/26/2011 have been fully considered but they are not persuasive.

5. In the remark section, pages 11-12, Applicant argued that Mori et al. [US 5,063,582] and Tabarelli et al. [US 4,509,852] would not have render obvious an exposure apparatus that irradiates a substrate through liquid comprising a temperature adjustment system which performs temperature adjustment for the substrate-holding member depending on a temperature of liquid to be supplied from the supply inlet onto the substrate held by the substrate-holding member.

The Examiner respectfully disagrees. The Mori reference is related to a temperature control system that implements a liquid coolant to adjust the temperature of a substrate holing member of a lithographic exposure apparatus for the purpose of keeping the temperature of the substrate at a predetermined value to avoid substrate deformation due to heat. Tabarelli on the other hand disclosed an immersion system that employs immersion liquid to increase the resolving capability of the projection lens with increased numerical aperture. Tabarelli further recognized the problem that occurs due to temperature fluctuation that appears in the exposure region and the need to keep it at a predetermined constant value by implementing the immersion liquid.

Therefore, it would have been obvious for an ordinary skill in the art at time the invention was made to combine the immersion system of Tabarelli in the lithographic system of Mori such that to improve the quality of image transfer by increasing the lens resolution and by preventing substrate deformation due to heat.

The Examiner further noted that Applicant stated, on the remark section page 12 Para 3 that "The Office Action alleges that, because the support 1 of Tabarelli is immersed in the liquid 6, the temperature of the support would be adjusted based on the temperature of the liquid (see Office Action, page 3, lines 1-6)." The above statement is incorrect.

In the stated Office Action, the Examiner indicated that both Mori (Column 2 line 20 – Column 3 line 15) as well as Tabarelli (Column 6 lines 14-42) disclosed the adverse effect of heat, due to exposure radiation, in exposure area and the need for controlling it to avoid substrate deformation which results in diminished quality of image transfer. In combining the two teachings, one of ordinary skill in the art would be motivated on setting the temperature of the coolant liquid that pass through the substrate support and the temperature of immersion liquid at a predetermined constant range which would be the same as the designated temperature for the substrate.

6. In the remark section, page 13 Para 2, Applicant argued that Mori and Tabarelli fail to disclose a supply inlet from which the liquid is supplied, the liquid supplied from the supply inlet covering only a portion of an upper surface of the substrate during exposure; a substrate stage having a substrate-holding member by which the substrate is held, the substrate-holding member holding the substrate on an underside of the substrate and the substrate-holding member being movable below the supply port.

The above argument is not persuasive. Tabarelli disclosed a supply inlet 4 (See figure 4) and a substrate 8 supported on the stage 1 from underneath of the substrate by means of vacuum lines 9 (See figure 3). Tabarelli's immersion system, which is the

early stages of immersion lithography, fails to show the immersion liquid covering only a portion of an upper surface of the substrate. However, the Lof reference which is the improved immersion lithography teaches the liquid covering only a portion of an upper surface of the substrate and the supporting structure is being movable below the supply port (See figure 4). Therefore, Applicant's argument on the above points is not persuasive.

7. Applicant's arguments with respect to Nijmeijer [US 20040189964] reference have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MESFIN T. ASFAW whose telephone number is

(571)270-5247. The examiner can normally be reached on Monday to Friday, 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MESFIN T ASFAW/
Examiner, Art Unit 2882

/Edward J Glick/
Supervisory Patent Examiner, Art Unit 2882